Using Red Hat Network Satellite Server to Manage Dell PowerEdge Servers

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Section 1

Executive Summary

Red Hat Network provides a simple systems solution for updating, deploying, and managing Red Hat Enterprise Linux systems. A subscription to Red Hat Enterprise Linux includes access to the Red Hat Network update module via the Internet. Through the use of a Red Hat Network Satellite server, customers can set up the Red Hat Network on their local network, giving them additional features and functionality. This gives the customer the ability to provide updates to their internal Red Hat Enterprise Linux systems without having to use the Internet. Additionally, using the Red Hat Network Satellite model allows customers to add their own custom content to be distributed and updated.

Section 2

Introduction

Updating enterprise systems with the latest security, enhancements, and bug fixes is critical in today's IT environment. The Red Hat® Network provides the ability to deploy, manage, and update packages for the Red Hat Enterprise Linux® operating system (OS)—potentially saving time and support costs while keeping systems secure and up to date. Internet access to the Red Hat Network is included as part of a subscription to Red Hat Enterprise Linux software, enabling organizations to manage their enterprise systems regularly with scheduled updates or automatically as updates become available. By obtaining updates directly from Red Hat, administrators can procure patches, security fixes, and enhancements that have been tested and authenticated by Red Hat engineers.

For a large number of servers, updates can consume a significant amount of bandwidth. Additionally, some administrators need to distribute their own unique packages across their infrastructure. To address these requirements, Red Hat offers the Satellite Server model, which allows all subscribed Red Hat Network content and functionality to be available locally (see Figure 1). Content can be downloaded from the Internet as updates become available, or CD-ROM images of the updated content can be downloaded separately and then loaded locally. Once the updates have been loaded, the Satellite Server can be completely disconnected from the Internet, allowing Red Hat OS–based systems to be updated through the Satellite Server while isolated or disconnected from the Internet.

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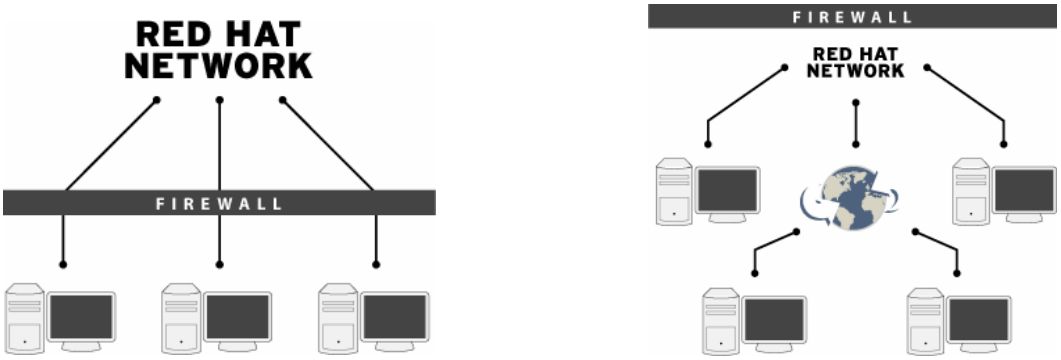

Figure 1: Two Methods for updating servers from the Red Hat Network: The hosted model (right) and the Satellite Server model (left)

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In many data centers, the number of Internet connections is minimized to maintain a high level of security. The Satellite Server model allows for a completely disconnected environment. However, administrators must determine how to transport the updates to an isolated Satellite Server. The options are to connect the Satellite Server to the Internet, or to load all the updates onto CD-ROMs and load the update content onto the local systems.

The Satellite Server model generally allows updates to occur faster than with Red Hat's hosted servers. Because the Satellite Server and the servers that are being updated through the Satellite Server are on an internal network, the available bandwidth between them is usually much greater than a connection over the Internet to Red Hat's hosted servers. If many systems must be updated and managed, then the increased speed of the Satellite Server updates can be a deciding factor in determining which Red Hat Network model to use.

Red Hat Network provides all of its software content in the form of channels. There is a separate channel for each version of Red Hat Enterprise Linux. The channels that we chose to provide on our Satellite server were the three Red Hat Enterprise Linux v.2.1 channels for the AS, ES, and WS versions and also the three Red Hat Enterprise Linux v.3.0 channels for the same three types.

Using a Red Hat Network Satellite Server also allows for the creation of custom channels and the distribution of custom software packages. By creating a custom channel and loading RPM™ (Red Hat Package Manager) software packages into that channel, administrators can use the Satellite Server to distribute and later provide updates to those packages.

The Red Hat Network offers three modules: Update, Management, and Provisioning. In the Dell™ lab discussed in this article, only the Update and Management modules are used. The Provisioning module adds the abilities to deploy, configure, manage, update, and redeploy systems as well as the ability to take snapshots of systems for future rollback, if needed. This article examines how the Dell lab uses the Red Hat Network Satellite Server model to manage its Dell PowerEdge™ servers—including the installation and configuration of the Satellite Server, updating of systems, and deployment of custom updates and packages using the Update and Management modules.

Section 3

Red Hat Satellite Server Setup

Administrators can install the Red Hat Network Satellite Server themselves or have it installed as part of a services engagement. Red Hat offers a five-day service that includes architecture assessment, installation, configuration, training, deployment, and troubleshooting.

The Hardware

In March 2004 the Dell lab installed and configured a Satellite Server for its Dell PowerEdge servers. Dell recommends using a Dell PowerEdge 2650 server for the Red Hat Network Satellite Server. Figure 2 shows the configuration details for the PowerEdge 2650 used in the Dell lab as well as the minimum requirements for any Satellite Server.

	RHN Satellite Minimum Requirements	Dell PowerEdge 2650
Operating System	Red Hat Linux Advanced Server 2.1	Red Hat Linux Advanced Server 2.1
CPU	2x 2.4 GHz Intel® Xeon™ Processors DP	2x 2.8 GHz Intel Xeon Processors DP
Memory	2 GB	4 GB
Internal Disks	3x 36 GB	5x 36 GB
NICs	Not Specified	2x 10/100/1000[1] Mb/s (internal) 2x Intel Pro 1000XT Gb
Disk Controller	SCSI recommended	PERC/3di Dual Channel

Table 1: Red Hat Network Satellite Server: Minimum Requirements for any deployment and configuration of PowerEdge 2650 used as Satellite Server for testing.

In the Dell lab, the five internal disks of the PowerEdge 2650 were configured as RAID-5 to provide the maximum amount of storage. One network interface card (NIC) is connected to the internal network and the other is connected to a network that has Internet access. Only one NIC at a time is used, and the firewall is always running to keep security at a high level.

The Software

The first step for the team at the Dell lab was to install Red Hat Enterprise Linux AS 2.1 on the Dell PowerEdge 2650. Using the latest version of Dell OpenManage™ Server Assistant, the team quickly installed the OS on the PowerEdge 2650, finishing in about 30 minutes. The firewall was configured on the server with only ports 23 (ssh), 80 (http), and 443 (https) open.

Satellite Server Install

A Satellite Server installation can be completed using the graphical user interface (GUI) or command-line interface (CLI)—both provide the same options. Using the GUI allows administrators to quickly and easily provide the correct information for all options. The Red Hat Network entitlement certificate, which is included as part of the Satellite Server purchase, must be provided during installation. The location of the entitlement certificate file can be specified, or the information can be entered in the provided spaces.

Administrators also have the option of using an embedded database server or a separate database server. A database is required as part of the Satellite Server model to manage channel content as well as the package content of each internal server. In the Dell lab, the local embedded database option was selected for ease of installation.

The option to create a Secure Sockets Layer (SSL) certificate is also presented during installation. To help maintain the highest level of security for the system, administrators should complete this step.

A final option in the setup is to create a bootstrap script. This script can greatly simplify the client systems' configuration and connection to the Satellite Server. The required fields should be prepopulated with the necessary information based on information entered in previous steps. In the Dell lab, the bootstrap file was saved in the /var/www/html/pub/bootstrap directory.

During the installation process, the Red Hat Network Satellite Server will update itself to all the proper patch levels. Best practices strongly recommend that administrators reboot this server after completing the installation process. If a kernel update was included, then administrators must reboot so that the system can boot with the new kernel.

Satellite Server Configuration

In the Dell lab, the two NICs in the Satellite Server were connected and configured so that one NIC had access to the Internet and the other NIC was connected to the isolated lab network. The NIC with access to the Internet was disabled by default at boot and only enabled during downloads of Red Hat Network content from the Red Hat hosted servers on the Internet. To ensure this, the Dell team created a simple script for calling the Red Hat Network update that includes the enablement and disablement of the NIC as part of the update download process. Complete script is listed in appendix A.

Script execution includes downloading all entitled channels. The initial download of channel packages can take several hours, depending on the connection speed, because there are up to 3 GB of packages per channel. Subsequent channel updates download only the incremental changes and usually complete in less than an hour, depending on connection speed.

For the initial channel synchronization, loading the channel content through Red Hat Network CD-ROMs is recommended. The Red Hat Network Web site provides CD-ROM ISO image files that can be used to create the CD-ROMs. Using the CD-ROMs can greatly reduce the time required for the initial channel synchronization. The Satellite Server can still download incremental updates from the Internet if the initial process is performed using CD-ROMs.

Once the channel content has been loaded onto the Satellite Server, the server is ready for use. Administrators should enter the fully qualified host name of the Satellite Server into a Web browser to launch the administration tool. A Satellite Server administrator account must be created the first time the server is used; this account information will be required for entry on subsequent visits.

Section 5

Updating and Managing Servers

New clients can be added to the Red Hat Network Satellite Server by using the bootstrap script that was created during the Satellite Server installation. The bootstrap script for Red Hat Enterprise Linux 2.1 is bootstrap-AS-2.1.sh, and the script for Red Hat Enterprise Linux 3.0 is bootstrap.sh. The following command should be executed on the client with the appropriate script name:

wget –O – https://<Satellite Server Name>/pub/bootstrap/<bootstrap script> | /bin/bash

This command will download the script and then execute it in a bash shell. When this command is executed on each client, the bootstrap script updates the necessary Red Hat Network components, registers each system with the Satellite Server, and performs the initial update with the channel content to which the system has been subscribed. Any configuration files for already installed packages will be saved with .rpmsave or .rpmnew added to the end of the filename. In the Dell lab, the update of a system that was running the initial version of Red Hat Enterprise Linux AS 2.1 was completed in less than 5 minutes, even though the server required more than 100 updates.

If the bootstrap script is not used to accomplish all these tasks, administrators can perform them individually. The *Red Hat Network Client Configuration Guide* and the *Red Hat Network Satellite Server 3.2 with Embedded Database Installation Guide* provide detailed instructions on the specific steps that must be taken to perform these tasks individually. Guides are available from https://rhn.redhat.com once a login and entitlement has been obtained by going to the "help" section.

Clients that have been added to the Red Hat Network Satellite Server will now appear in the management console where their current update status can be viewed See Figure 2.

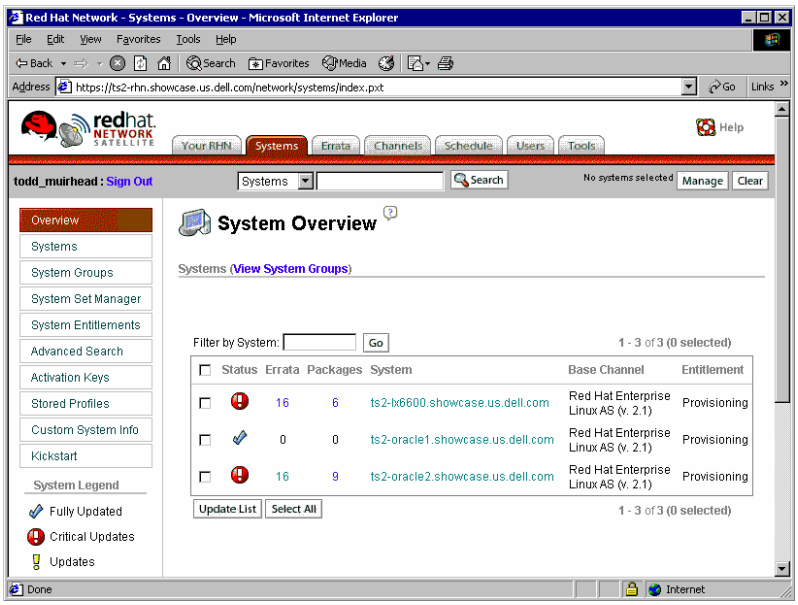

Figure 2 : Managing Systems with the RHN Satellite Server GUI

Custom Channels

In addition to the default channels, custom channels can be added to the Satellite Server. Custom channels can contain packages that are not standard Red Hat packages, but they must be in the RPM format. If the software to be distributed and managed is not currently an RPM, then the `rpmbuild` command can be used to create an RPM. Several third-party software packages are already offered as RPMs, so in many cases administrators will not be required to build one.

In the Dell lab, many of the servers are connected to a Dell/EMC storage area network (SAN). Every system attached to the SAN must have EMC® Navisphere® Agent software installed. This agent allows for communication between the Dell/EMC storage arrays and the server. A custom channel was created to provide the Navisphere Agent to the SAN-connected servers.

The default channels are known as parent channels; any custom channels that are created must be a child channel of one of the parent channels. In the Dell lab, a child channel called naviagent was created for the Red Hat Enterprise Linux AS 2.1 channel through the Manage Software Channels page of the Satellite Server administration tool. After clicking the Create New Channel button, the Dell team selected the parent channel name. Navisphere Agent was specified as the channel name and Naviagent as the channel label.

To upload an RPM into a custom channel, administrators must use the `rhnpush` command. The Dell team downloaded the most recent Navisphere Agent RPM from EMC to the Satellite Server and used the following command to upload it into the Naviagent channel:

rhnpush –c naviagent –nosig –server http://<satelite_server_name>/APP naviagent-6.4.0.5.0-1.i386.rpm

The `-nosig` option was used because this RPM was not signed with a security key. Multiple packages can be uploaded simultaneously simply by listing them at the end of the

command. Administrators can create a digital signature for customer-created channels to ensure that packages did in fact come from the Satellite Server.

The Dell team added the Naviagent channel for the SAN-connected servers. The next time the servers connected to the Satellite Server for updates, they received the new Navisphere Agent as well as any new Red Hat updates.

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Section 6

Conclusions

The Red Hat Network Satellite Server model can provide an excellent way to manage updates and software deployments for Red Hat Enterprise Linux systems. Using the Satellite Server model, the Dell lab was able to completely automate the deployment of the latest Red Hat patches and updates to its Red Hat Linux-based servers. Additionally, the ability to add custom channels to the Satellite Server allowed the lab to deploy and update other software needed on the servers. Besides providing an efficient method for updating the lab's Red Hat Enterprise Linux–based servers, the Satellite Server model can potentially save numerous hours of effort each time a new update is required compared to traditional manual methods.

For more information on Red Hat Network, please visit http://www.redhat.com/rhn

[1]This term indicates compliance with IEEE standard 802.3ab for Gigabit Ethernet, and does not connote actual operating speed of 1 Gb/sec. For high speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.

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Appendix A. Satellite Sync Script

```
ifdown eth1
sleep 10
ifup eth0
sleep 120
satellite-sync -c redhat-advanced-server-i386 -c redhat-ent-linux-  i386-es-2.1 -c redhat-ent-
       linux-i386-ws-2.1 -c rhel-i386-as-3 -c rhel-i386-es-3 -c rhel-i386-ws-3
ifdown eth0
sleep 10
ifup eth1
```